Increasing the efficiency of the SCHOOL LUNCH KITCHEN

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INCREASING THE EFFICIENCY OF THE SCHOOL LUNCH KITCHEN

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Efficient arrangement of space and equipment in the school lunch kitchen is of major importance in economical management. By streamlining the layout, it is often possible to make a kitchen more productive with the same number of workers, thus cutting down the cost of labor, which is usually a very substantial item in the total meal cost. This publication describes a method of appraising school kitchen layouts by a study of food-preparation routes and suggests ways of improving layouts to increase kitchen efficiency. The method may be used in planning for remodeling or for new kitchens.

In large quantity food preparation, the forward movement of food from delivery to service may be compared to the assembly line in a manufacturing plant. A short, direct route that enables workers to prepare and serve meals with the fewest possible steps indicates an efficient kitchen layout. If the route requires much backward or cross travel the layout is wasteful of workers' time and energy. The length of the food-preparation route depends primarily upon (1) size of lunchroom area, (2) arrangement of equipment, (3) location of receiving and storage areas in relation to kitchen, and (4) location of preparation centers with respect to serving unit.

For practical purposes, the line of travel followed during the preparation of a particular food or dish has been called the actual food-preparation route. By observing and tracing actual food routes, the amount of backward or lateral travel required for the preparation of each food on any menu can be determined.

For different foods, actual preparation routes follow somewhat different courses, depending upon the kind of food, the preliminary preparation needed, such as cleaning, cutting, or peeling, and whether the food is to be cooked or prepared without cooking. Since it is necessary to establish a basic route that does not vary in order to measure the relative efficiency of any kitchen, the following formula has been devised: The basic food-preparation route is the measured distance from storeroom to sink supplying water for preliminary cleaning processes, to cook's table, to range, to serving counter. The direction and relative length of this route may be used as a means of appraising the efficiency of layout of kitchen space and equipment.

In 18 schools studied, each serving from 300 to 500 lunches daily, the basic food routes ranged from 35 to 116 feet, with an average of 66 feet. As the kitchens were generally comparable in size, differences in length of food routes were accounted for by (1) the distance from the storeroom to kitchen work centers and (2) scattered arrangement of equipment that resulted in backward or cross travel. For efficient operation it is essential to locate the peeler, grinder, and cutter near the preliminary-preparation sink; the mixer and the pot-and-pan sink close to the cook's table, which should be at right angles or parallel to the range; the refrigerator not far from both preliminary and preparation centers; the dishwashing unit adjacent to the dining room; and clean-dish storage convenient to the serving unit.

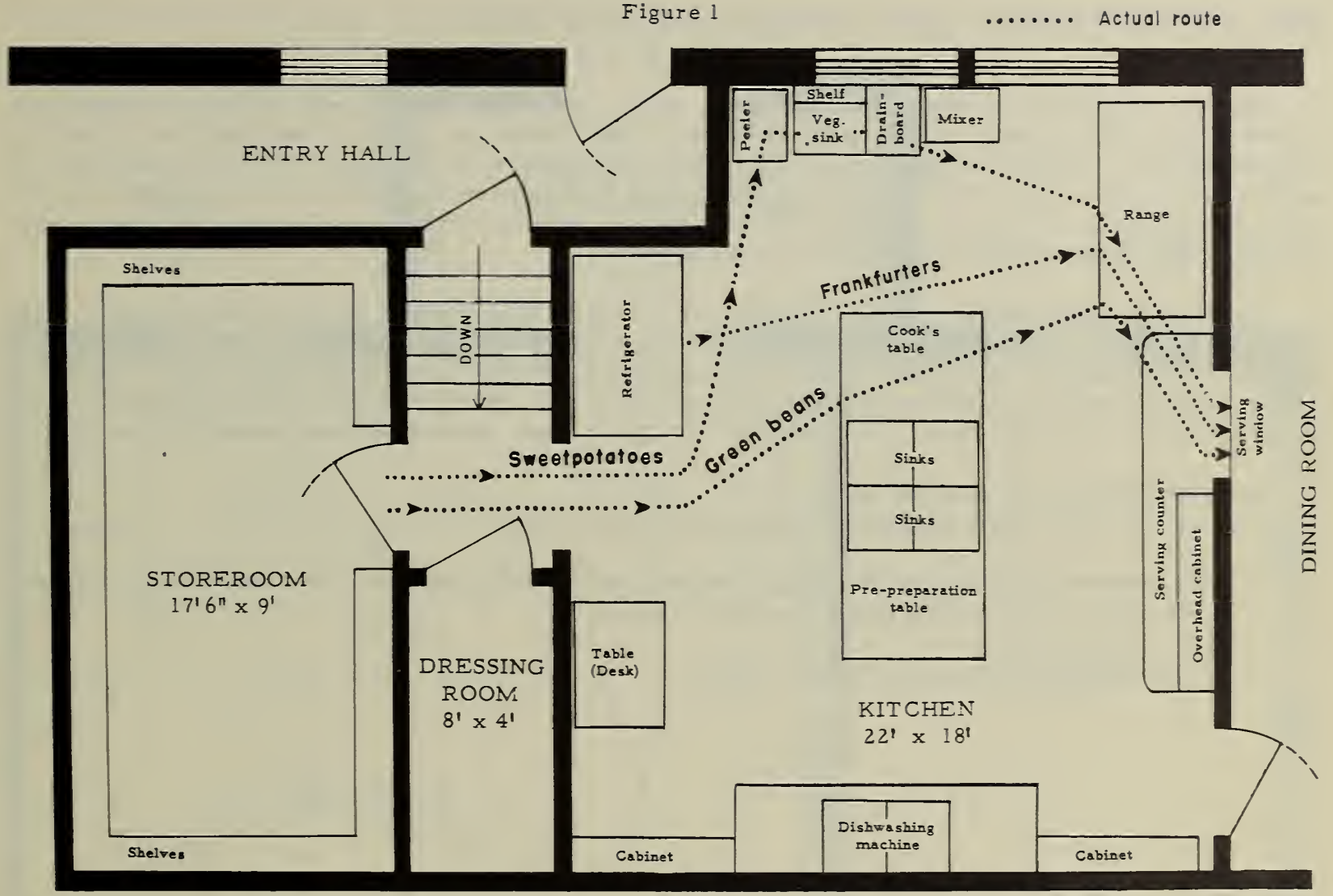
On the following pages are school lunch kitchen floor plans showing food-preparation routes. Suggestions for improved layouts that will provide more direct routes are given, together with cut-outs to help in planning for rearrangement of equipment. (See figs. 1 - 9.)

EFFICIENT KITCHEN SHOWING ACTUAL FOOD-PREPARATION ROUTES

Figure 1 shows a school lunch kitchen, 22 by 18 feet, in which about 400 Type-A lunches are prepared daily. Hot foods are served on the pupils' plates at the counter next to the range. The plates are passed through the serving window into the dining room where bread, table fat, and milk are served. The hot foods served in one meal included frankfurters, green beans, and sweetpotatoes. The actual food-preparation routes for these foods, as shown in the illustration by dotted lines, are short and direct.

Although the kitchen is efficient in respect to the preparation and serving of meals, provision of a soiled-dish return window and additional soiled- and clean-dish tables would be an improvement. A suggestion would be to install a hinged shelf across the doorway, between kitchen and dining room, to which soiled dishes could be returned by the pupils. The space on either side of the dishwashers could be used for soiled- and clean-dish tables.

Figure 1


..... Actual route
ENTRY HALL
Peeler
Shelf
Veg. sink
Drain-board
Mixer
Range
Shelves
DOWN
Refrigerator
Frankfurters
Cook's table
Green beans
Sweetpotatoes
Sinks
Sinks
Serving window
DINING ROOM
STOREROOM
17'6" x 9'
DRESSING ROOM
8' x 4'
Table (Desk)
Pre-preparation table
Serving counter
Overhead cabinet
KITCHEN
22' x 18'
Shelves
Cabinet
Dishwashing machine
Cabinet

SMALL KITCHEN SHOWING BASIC FOOD-PREPARATION ROUTE

Figure 2 illustrates a school lunch kitchen, 22-1/2 by 15-1/2 feet, in which Type-A meals are prepared for approximately 300 pupils each day. The kitchen is smaller than the size generally recommended. A school kitchen considered most satisfactory for serving 75 to 350 meals has 1.5 square feet of floor space for each meal served, with a storeroom approximately one-fifth the size of the kitchen area. The area of this kitchen is only 1.1 square feet per meal served and the receiving space and storeroom are much larger than needed.

The basic food-preparation route is shown by a broken line starting at the storeroom door. Its length is 50 feet. A dot-and-dash line indicates the route from the delivery door to the storeroom; however, this distance is not included in the measured length of the basic food route. Delivery traffic passes through the kitchen and dining room. The storeroom, although adjacent to the kitchen is not directly accessible to it. No provision has been made for soiled-dish return by the pupils.

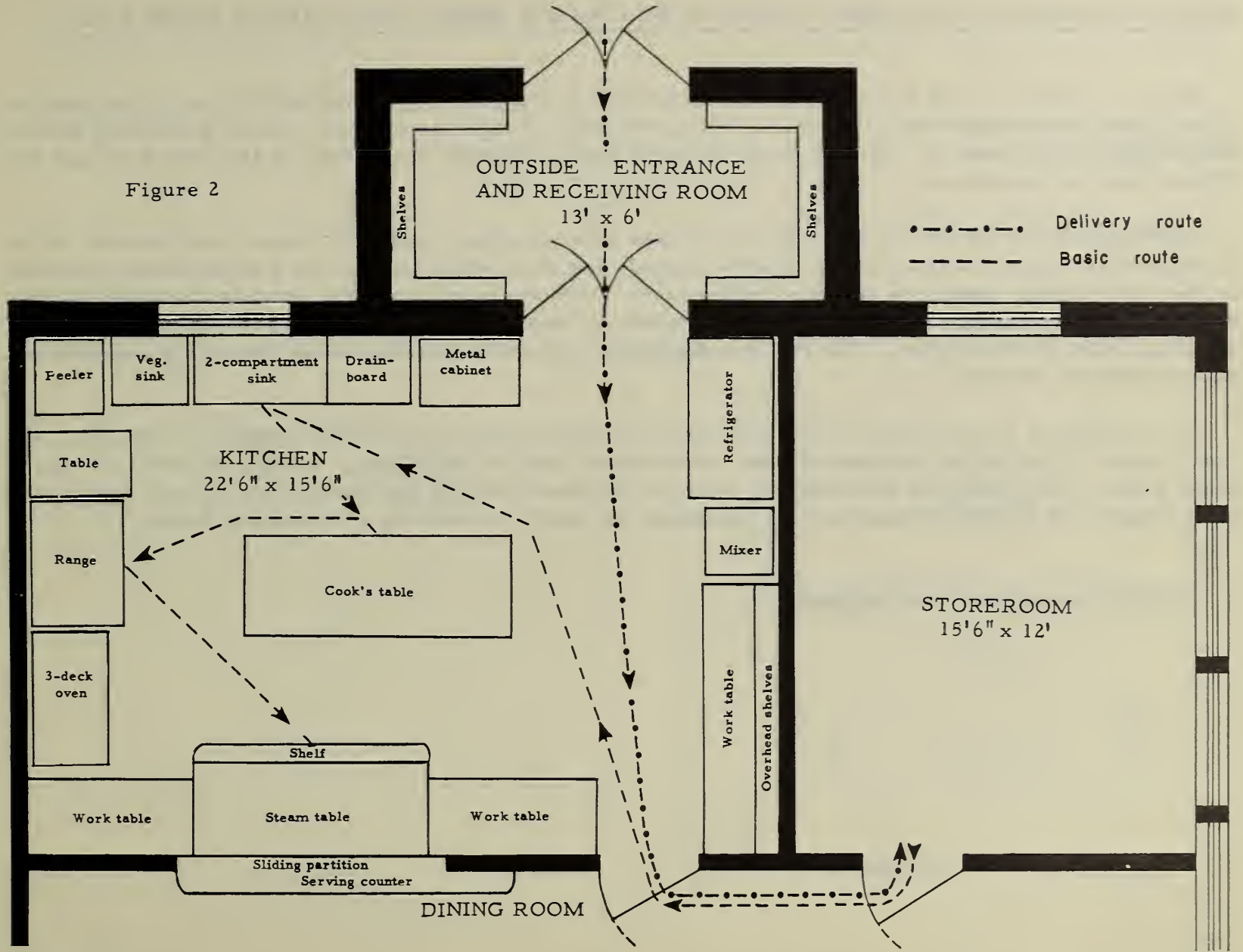
The main problems in this kitchen are:

1. To make the basic food-preparation route more direct.

2. To relieve congestion in the small kitchen, particularly near the two-compartment sink and the cook's table when dishes are being washed.

3. To provide a soiled-dish return window.

Figure 2


OUTSIDE ENTRANCE
AND RECEIVING ROOM
13' x 6'
Shelves
Shelves
Delivery route
Basic route
Peeler
Veg. sink
2-compartment sink
Drain-board
Metal cabinet
Refrigerator
Table
KITCHEN
22'6" x 15'6"
Range
Cook's table
Mixer
STOREROOM
15'6" x 12'
3-deck oven
Work table
Overhead shelves
Shelf
Work table
Steam table
Work table
Sliding partition
Serving counter
DINING ROOM

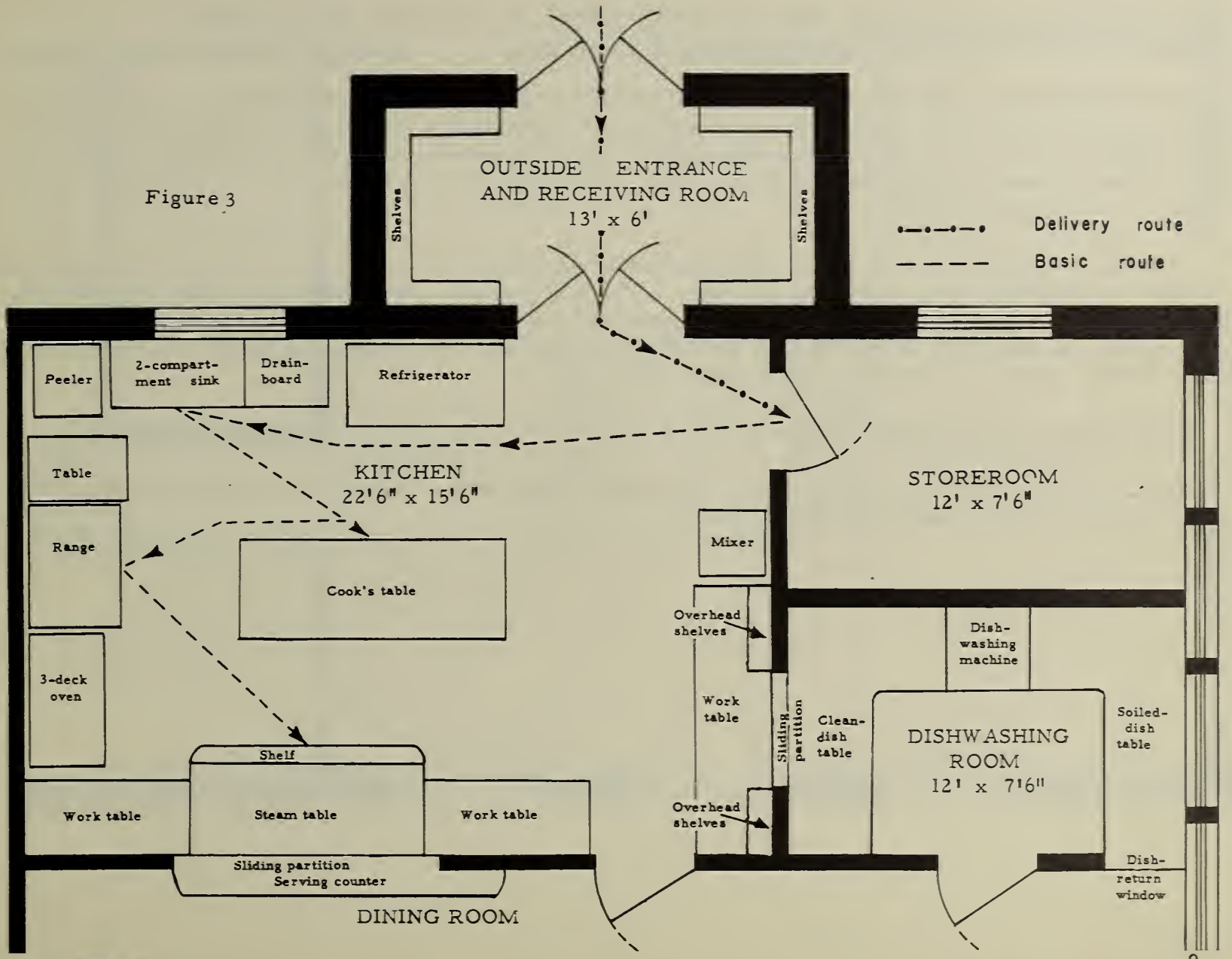
PLAN FOR REMODELING SMALL KITCHEN TO CHANGE BASIC FOOD-PREPARATION ROUTE

Figure 3 shows a plan for remodeling the kitchen in figure 2 which makes the basic food-preparation route more direct and eliminates delivery traffic through kitchen work areas and dining room. The length of the route is reduced from 50 to 41 feet by cutting a doorway in the wall between the kitchen and the storeroom.

Dividing the storeroom by a partition provides a dishwashing room, yet leaves a sufficiently large storage area. A soiled-dish return window, soiled- and clean-dish tables, and a dishwashing machine in the dishwashing room are included in the plan. An opening with sliding windows between kitchen and dishwashing room, above the clean-dish table, permits clean dishes to be moved from the dishwashing room to the kitchen. The two-compartment sink in the kitchen is for vegetable preparation and pot-and-pan washing.

The suggested arrangement would save time and labor for the lunchroom workers. With this new plan, pupils could serve themselves and return their own soiled dishes, freeing the workers from these duties. Removing the dishwashing from the kitchen relieves the congestion; soiled- and clean-dish tables and a dishwashing machine facilitate the work of handling and washing dishes.

Figure 3



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LARGE KITCHEN REQUIRING TRAVEL ACROSS ROOM IN PREPARATION OF MEAL

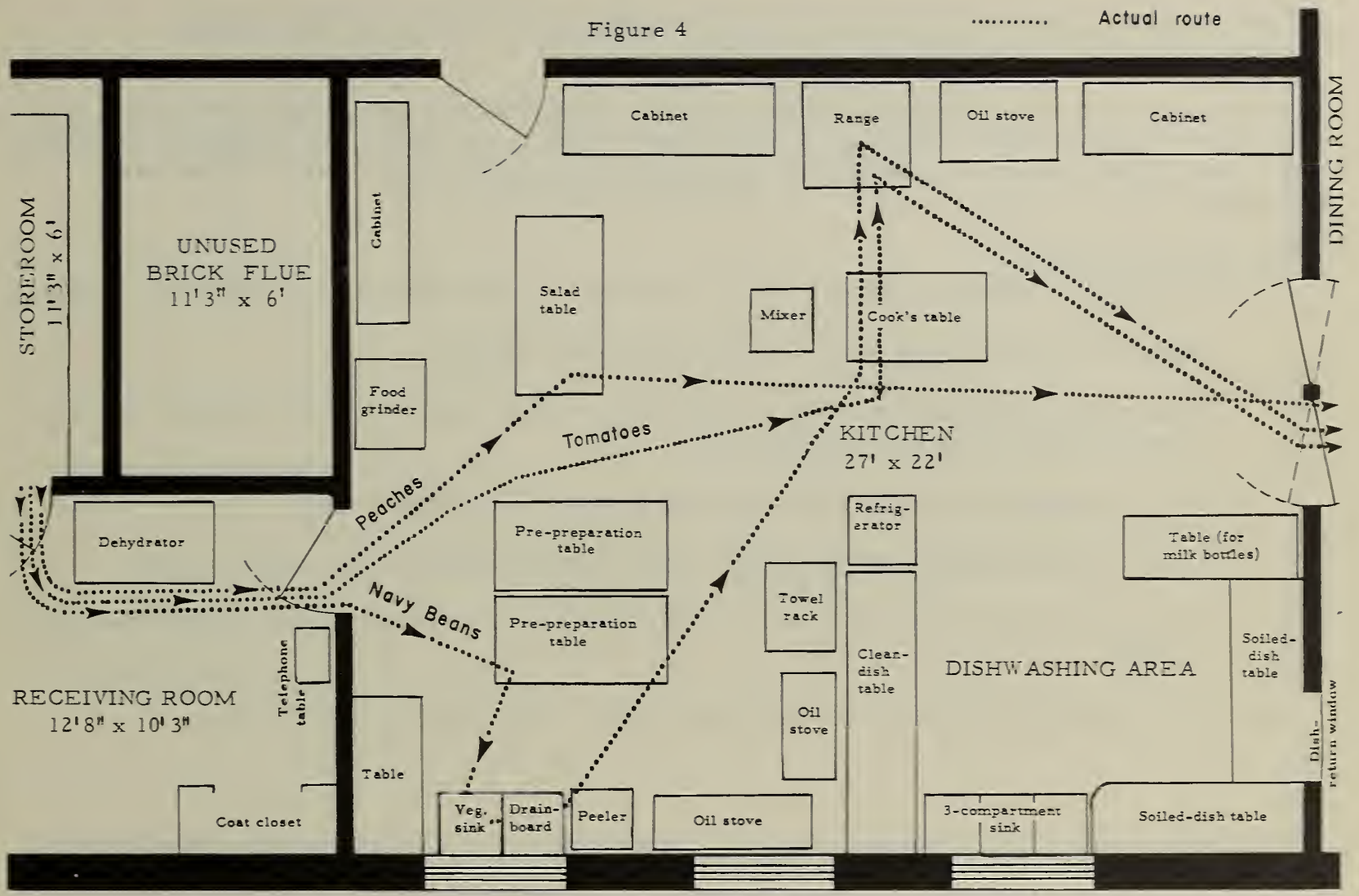
Figure 4 illustrates a large school lunch kitchen, 27 by 22 feet, in which the floor area is 1.7 square feet per meal served About 350 Type-A meals are served in this school. The actual food-preparation routes represent a meal which included navy beans, tomatoes, and canned peaches. Other foods in the meal--bread, sweet rolls, and milk--were not handled in the kitchen but were delivered to the serving counter in the dining room.

Although the movement of food in this kitchen progresses in a forward direction, the scattered location of the equipment lengthens the route. The one-compartment sink for washing vegetables, fruits, and other foods is on one side of the room and the cook's table and range are on the opposite; as a result, considerable travel across the room is required. The unused dehydrator is an obstacle in the path from the storeroom to the kitchen entrance.

The basic food-preparation route which was found to be 63 feet is not shown on this sketch.

Note: The oil stoves are not in use. A walk-in refrigerator has been ordered for installation in a bricked space formerly used as a flue.

Figure 4


..... Actual route
STOREROOM
11'3" x 6'
UNUSED
BRICK FLUE
11'3" x 6'
Cabinet
Cabinet
Range
Oil stove
Cabinet
DINING ROOM
Salad table
Mixer
Cook's table
Food grinder
Tomatoes
Peaches
KITCHEN
27' x 22'
Dehydrator
Pre-preparation table
Refrig-erator
Table (for milk bottles)
Navy Beans
Pre-preparation table
Towel rack
Clean-dish table
DISHWASHING AREA
Soiled-dish table
Telephone table
RECEIVING ROOM
12'8" x 10'3"
Oil stove
Dish-return window
Table
Veg. sink
Drain-board
Peeler
Oil stove
3-compartment sink
Soiled-dish table
Coat closet

REARRANGING LARGE KITCHEN TO SHORTEN BASIC FOOD-PREPARATION ROUTE

Study the layout of equipment as shown in figure 4 and draw the basic food-preparation route. Then, using the blank floor plan (fig. 5) and cut-outs (fig. 8) rearrange the equipment to permit a more direct flow of work and shorten the basic food-preparation route. Draw the new basic route and compare with the old.

One plan would be to:

1. Remove the dehydrator stored in the receiving room but not used for lunchroom purposes.

2. Move the electric range to the opposite side of the kitchen.

3. Place the cook's table (preferably a longer one with overhead utensil rack) near the range, parallel with or at right angles to it.

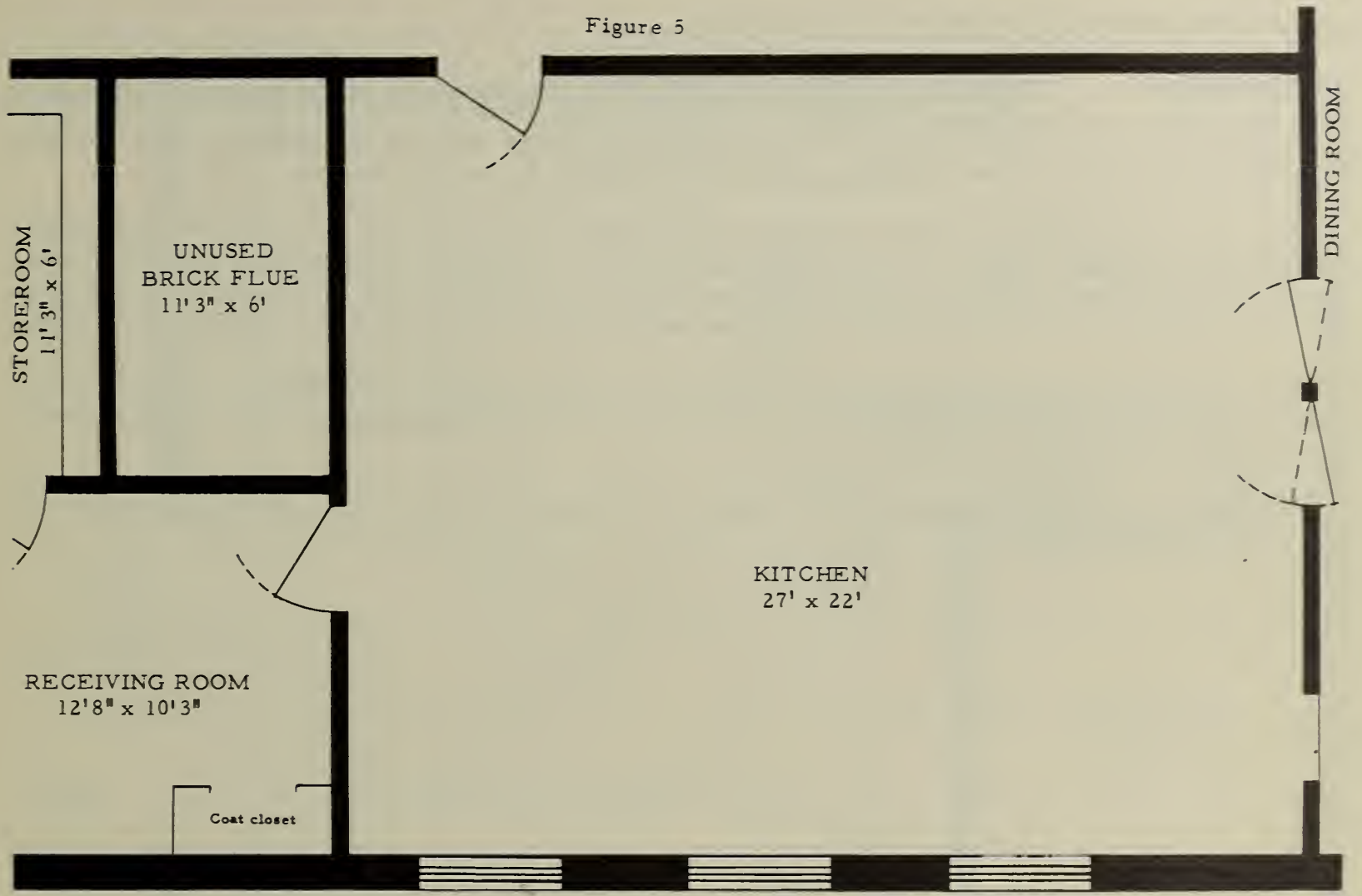
4. Install the potato peeler to discharge directly into the vegetable sink.

5. Move the dishwashing unit across the room, and cut a soiled-dish return window.

6. Widen the present soiled-dish return window for use as a serving or pass window for cooked food.

Other equally effective plans for shortening the food routes could be worked out.

Figure 5


STOREROOM
11' 3" x 6'
UNUSED
BRICK FLUE
11' 3" x 6'
DINING ROOM
KITCHEN
27' x 22'
RECEIVING ROOM
12' 8" x 10' 3"
Coat closet

LARGE KITCHEN REQUIRING BACK-TRACKING

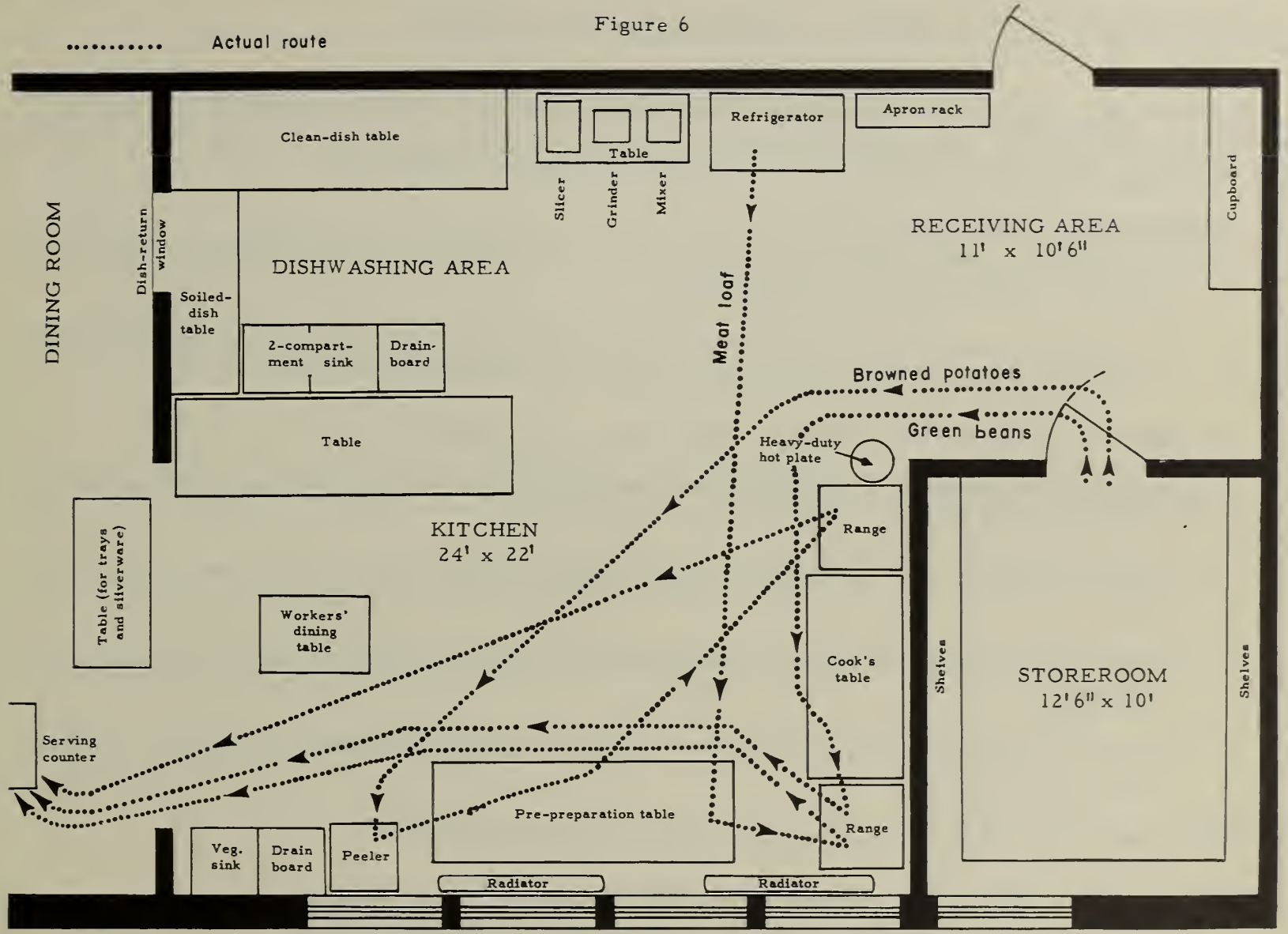
In the 22- by 24-foot kitchen illustrated in figure 6, the floor area of the kitchen, including the receiving area, is 1.3 square feet per meal served, whereas the size recommended for kitchens serving 500, the approximate number served in this school, is 1 square foot per meal.

The layout of equipment in this large kitchen requires considerable back-tracking during the preparation of a meal. Since the one-compartment sink for washing vegetables and fruits is located at the front of the room and the ranges at the rear, an orderly flow of work is impossible. The problem of crossing lines of traffic also exists. The storeroom is well located in relation to the kitchen.

The actual food-preparation routes are shown for a plate lunch of meat loaf, browned potatoes, and green beans. Routes are not shown for several miscellaneous foods which were offered the same day in addition to the plate lunch.

The basic food-preparation route is not shown on this sketch; it is 93 feet, or 30 feet longer than that of the kitchen in figure 4.

Figure 6


Actual route
Clean-dish table
Table
Slicer
Grinder
Mixer
Refrigerator
Apron rack
Cupboard
DINING ROOM
Dish-return window
DISHWASHING AREA
RECEIVING AREA
11' x 10'6"
Soiled-dish table
2-compart-ment sink
Drain-board
Meat loaf
Browned potatoes
Green beans
Table
Heavy-duty hot plate
Range
KITCHEN
24' x 22'
Table (for trays and silverware)
Workers' dining table
Cook's table
Shelves
STOREROOM
12'6" x 10'
Shelves
Serving counter
Pre-preparation table
Range
Veg. sink
Drain board
Peeler
Radiator
Radiator

REARRANGING LARGE KITCHEN TO CORRECT BACK-TRACKING

Draw the basic food-preparation route in the kitchen in figure 6. Then, using the floor plan (fig. 7) and the cut-outs (fig. 9), rearrange the equipment. Test the efficiency of your new layout by drawing the new basic food-preparation route and comparing with the one in figure 6.

A suggested plan for remodeling is:

1. Place the two ranges and heavy-duty hot plate on pedestal in a unit along the outside wall and well toward the front of the kitchen.

2. Move the two-compartment sink with drainboards to the rear of the room along the storeroom wall and install the potato peeler with one-compartment sink next to it.

3. Place the cook's table parallel to and in front of the ranges.

4. Install the mixer at the end of the cook's table toward the rear of the room and the grinder and slicer next to and in line with it.

5. Move the refrigerator to the center of the room, having the doors open toward the cook's table.

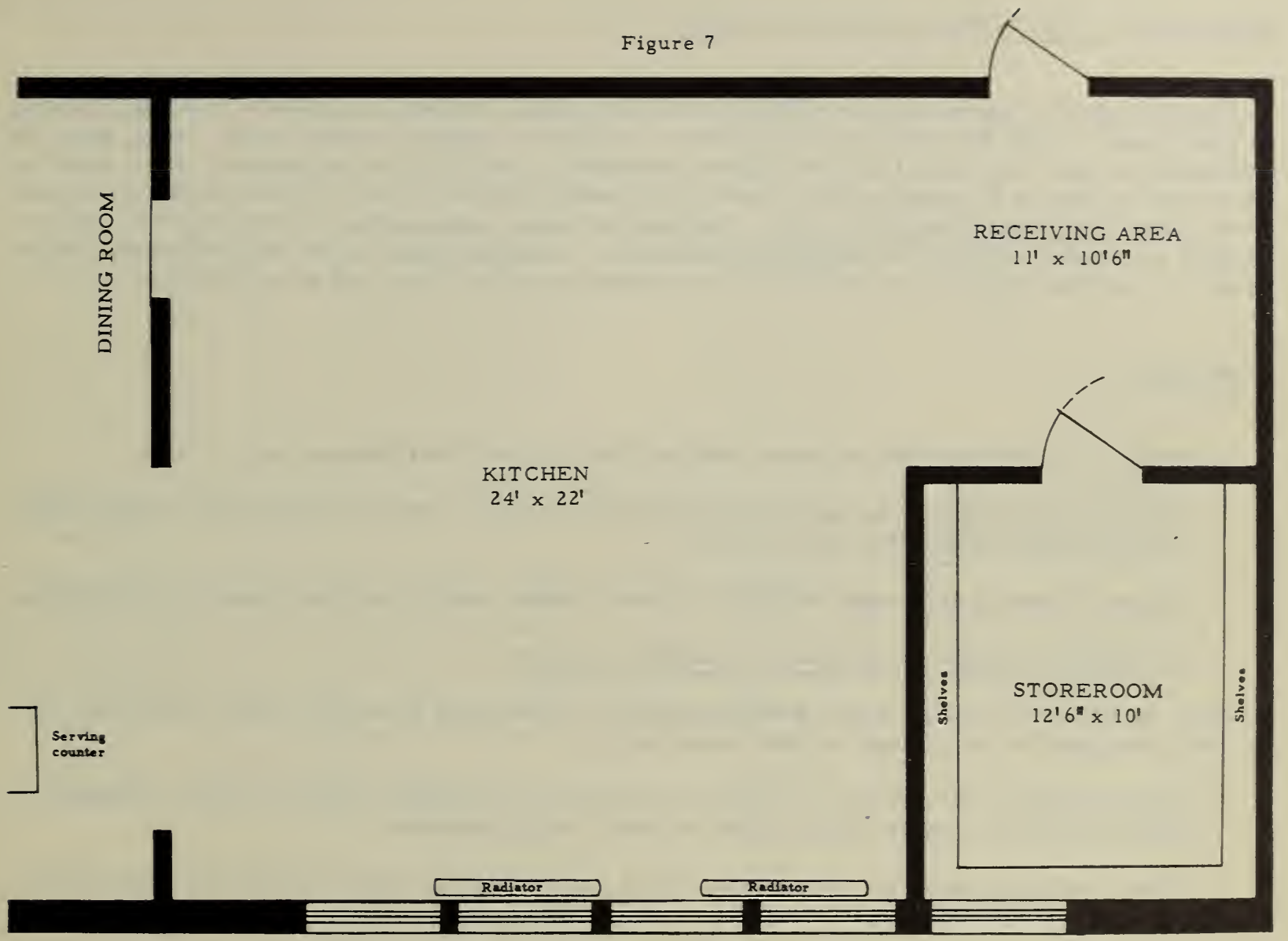
6. Install a dishwashing machine with soiled- and clean-dish tables along the lengthwise inside wall.

7. Partition the space in the rear corner next to the kitchen entrance to provide a dressing room for the workers.

Slight changes in number or size of work tables may be advisable.

Other layouts, equally efficient, may be considered.

Figure 7


DINING ROOM
RECEIVING AREA
11' x 10'6"
KITCHEN
24' x 22'
STOREROOM
12'6" x 10'
Shelves
Shelves
Serving counter
Radiator
Radiator

ANALYZING YOUR SCHOOL LUNCH KITCHEN

The first step in appraising the efficiency of your school kitchen is to make a freehand drawing on plain paper, of the kitchen floor area with the equipment roughly located on it. Next, take the dimensions of the room and of the floor space occupied by each piece of equipment. Then draw the layout approximately to scale on the cross-section paper provided (scale, 1/4 inch equals 1 foot) and draw in the basic food-preparation route. Studying the length and direction of this line will show you whether or not the kitchen is arranged for efficiency. The actual food routes followed in the preparation of a certain meal will serve as a further indication of the efficiency of the kitchen.

SUMMARY

To make an inconvenient kitchen more efficient the least difficult changes are to:

Rearrange equipment to allow a forward flow of work and prevent retracing steps, cross traffic, and interference with other work centers.

Dispose of unused equipment to clear the line of traffic and provide more space in the kitchen.

Use available equipment or space for another purpose.

Some changes and improvements involving larger expenditures of money which, eventually, may be more than paid for by savings in labor costs are to:

Add equipment to save time and energy of workers, for example trucks, trays, and tables on casters, as well as major pieces such as mixer and dishwasher.

Make structural changes. For example, cut a doorway so the storeroom will be more accessible, or make an opening to be used as a soiled-dish return window.

Figure 8

CUT-OUTS FOR USE IN FIGURE 5

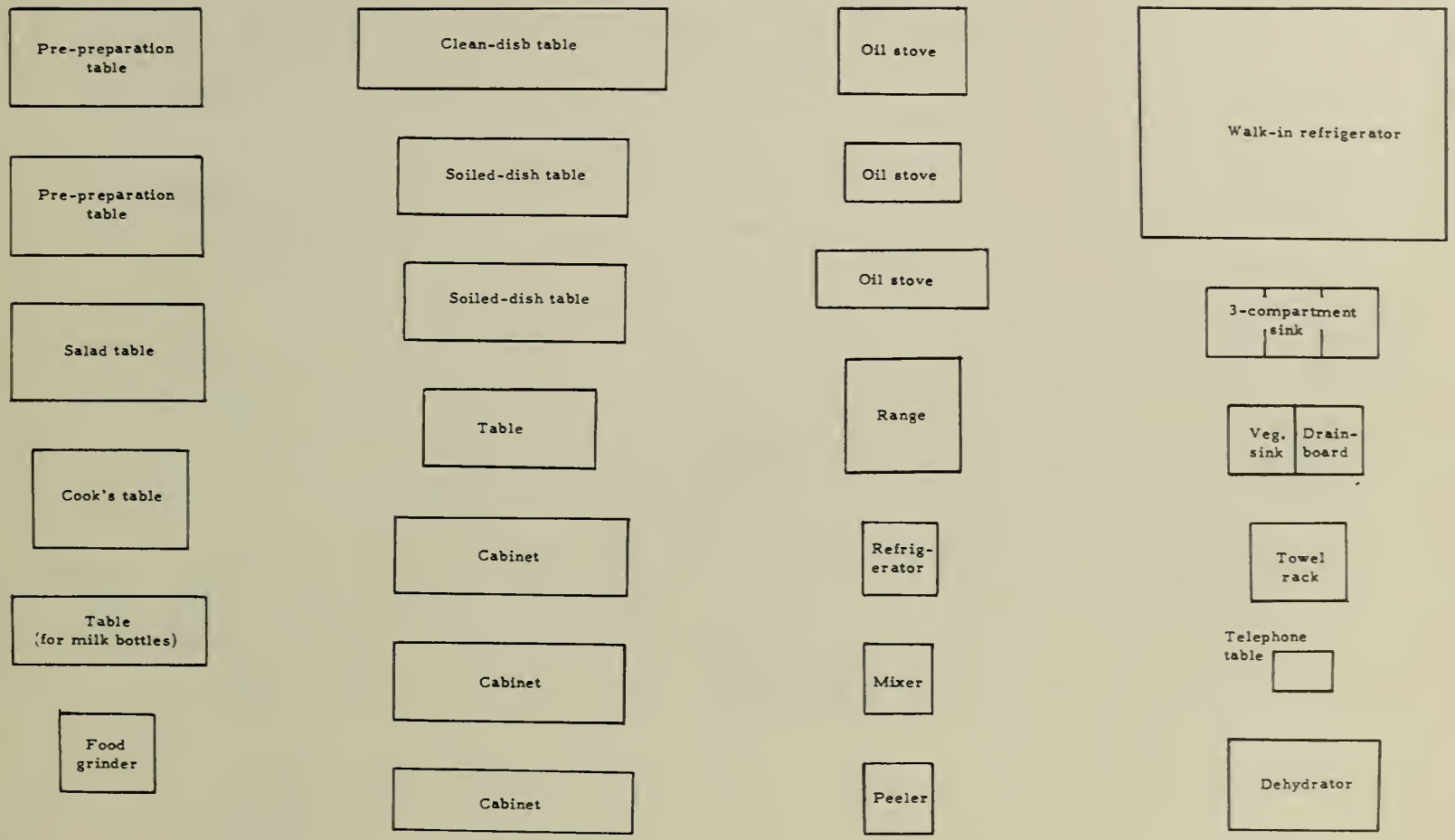
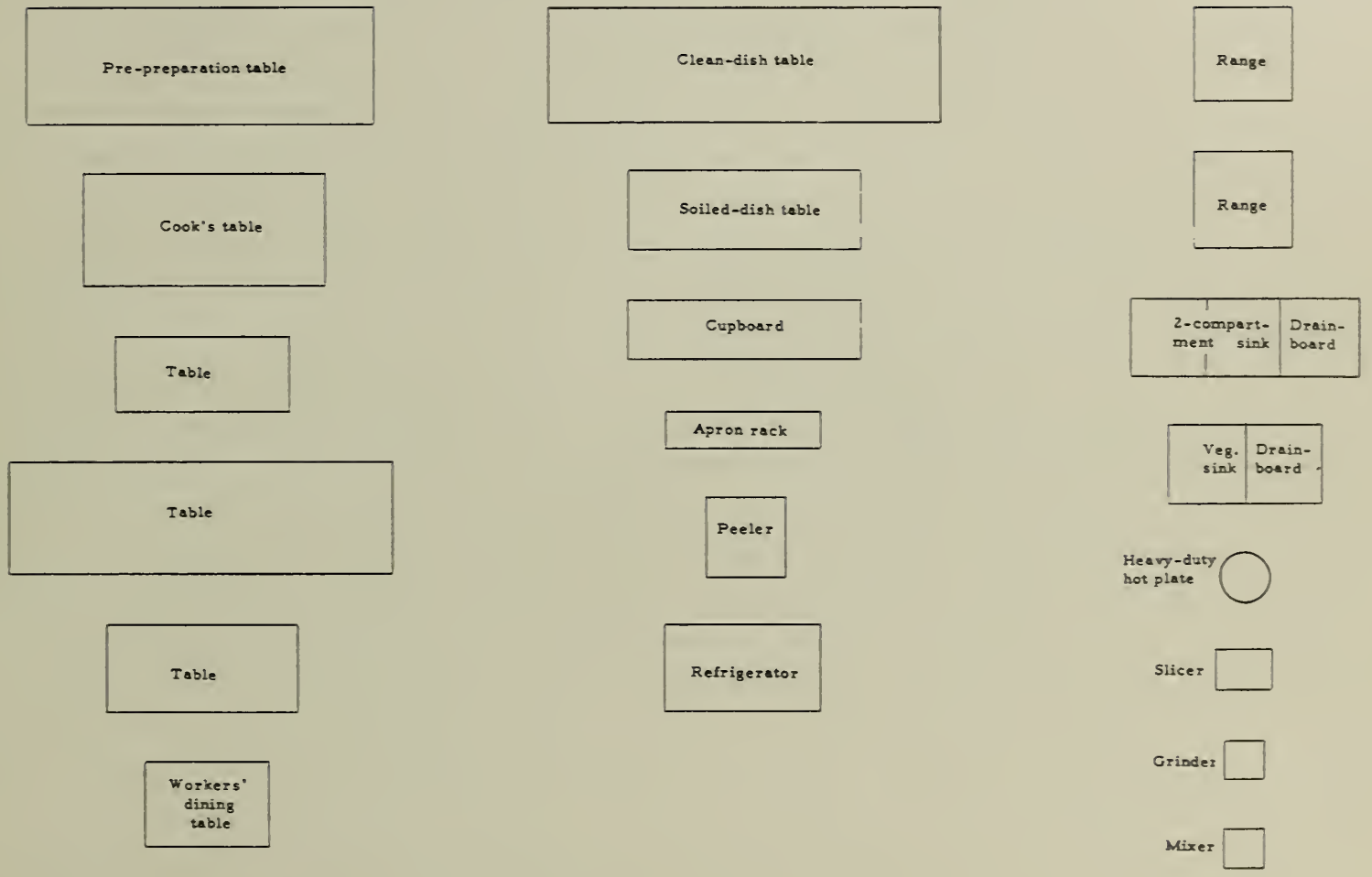
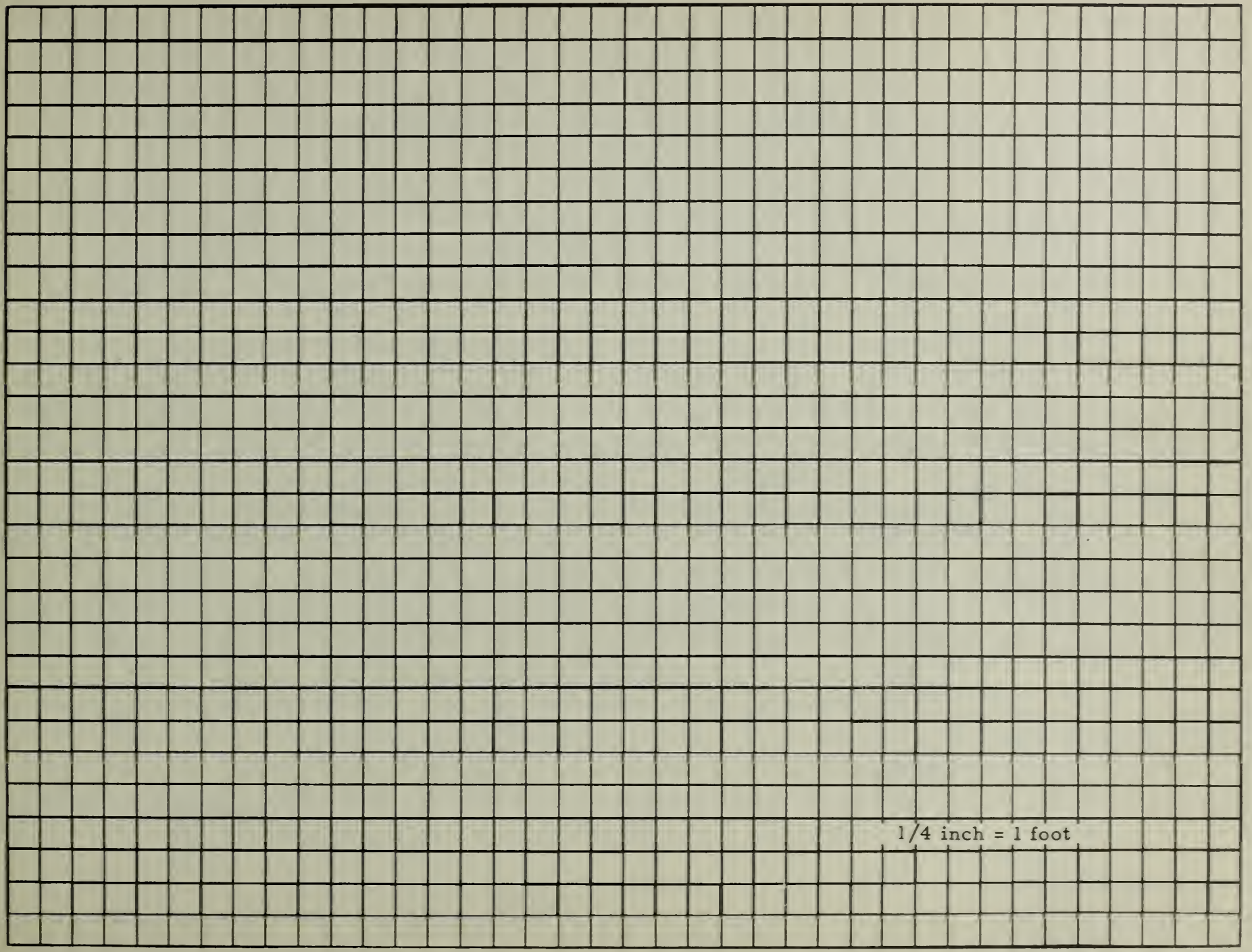


Figure 9

CUT-OUTS FOR USE IN FIGURE 7





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